

Black hole mass formula in the membrane paradigm

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Abstract

© 2018 American Physical Society. The membrane paradigm approach adopts a timelike surface, stretched out off the null event horizon, to study several important black hole properties. We use this powerful tool to give a direct derivation of the black hole mass formula in the static and stationary cases without and with electric field. Since here the membrane is a self-gravitating material system, we go beyond the usual applicability on test particles and test fields of the paradigm.

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